



**BURLINGTON
ENVIRONMENTAL**

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March 9, 1993

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RCRA PERMITS SECTION

Mr. David Croxton
EPA Project Coordinator
U.S. EPA
1200 Sixth Avenue, M/S HW-106
Seattle, WA 98101

Mr. Croxton:

Attached is the Bimonthly Progress Report required by the 3008(h) Order for RFI activities completed at the Burlington Environmental Inc. Pier 91 Facility for the months of January and February 1993.

If you have any questions or require further information, please contact me at (206) 654-8153.

Sincerely,

John Stiller
Project Coordinator

cc: Barb Smith, Ecology NWRO

USEPA RCRA



3012352



PROJECT MEMORANDUM

DATE: March 8, 1993

TO: Dave Haddock Gary Podrabsky
Nate Mathews John Stiller

FROM: Joe Depner *JD*

SUBJECT: RFI PROGRESS REPORT, PIER 91 FACILITY, JANUARY 1993 TO
FEBRUARY 1993

This memorandum summarizes the Technical Services Division's progress on the Pier 91 RCRA facility investigation (RFI), from January 1 to February 28, 1993. This is the fourth bimonthly progress report for the Pier 91 RFI. The 3008(h) order for the facility requires that progress reports be submitted bimonthly until the order is terminated.

DESCRIPTION AND ESTIMATE OF WORK COMPLETED

The following work was completed during the reporting period:

1. Boreholes CP-106B, CP-115B, and CP-122B were drilled, and soil samples were collected from each.
2. Samples of the material in the silty sand layer were collected from each of the three boreholes listed above, and were tested for triaxial permeability.
3. The permanent shallow surface casings for all three of the above deep aquifer wells were installed.
4. The Tidal Monitoring and Pumping Test Work Plans submitted to the U.S. Environmental Protection Agency (USEPA) in October 1992 were revised in response to USEPA comments, and resubmitted.

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SUMMARY OF ALL FINDINGS

Preliminary interpretation of the available stratigraphic data from the three new deep boreholes suggests that the deep aquifer is approximately four feet thick and extends from approximately 38 to 42 feet below ground surface (bgs). Lithologic samples from these depths can be described as fine to medium sand. The deep aquifer is overlain by the silty sand layer, and is apparently underlain by a clayey silt.

Reported permeabilities for the three soil samples from the silty sand layer, as inferred from triaxial permeability tests, range from 4.8×10^{-6} to 8.1×10^{-5} centimeters per second (cm/s). A copy of the laboratory test results is attached.

SUMMARY OF ALL PROBLEMS ENCOUNTERED

Borehole CP-122A

While drilling borehole CP-122A, a void was discovered beneath the surface concrete slab surrounding the borehole. The void appeared to slope away from the borehole, suggesting that it may have been caused by a disturbance at a nearby, but different, location. The borehole was abandoned by emplacing bentonite chips from the bottom of the borehole (approximately 30 feet bgs) to the bottom of the surface concrete slab (approximately 8 inches bgs).

No further attempts have been made to install the shallow monitoring well CP-122A, for the following reasons. First, if soil settlement continues to occur in this area, any shallow monitoring well may become altered to the extent that it is no longer capable of yielding representative groundwater samples. Second, even if the settlement is no longer active, if future action is required to correct the settlement (e.g., excavation and/or construction), such action may in itself compromise the well's ability to yield representative groundwater samples. In either case, installation of a shallow monitoring well in this area appears to involve some risk.

A final resolution to the problem of installing well CP-122A has not yet been found. Burlington is compiling a request for variance from the RFI Work Plan, for modifying the design and installation procedure for this well. The variance likely will involve installation of a temporary shallow piezometer at the proposed location of well CP-122A.

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Borehole CP-106B

While attempting to drill the shallow portion of borehole CP-106B, buried concrete was encountered at a depth of approximately one to two feet bgs. The concrete appeared to be part of a slab that may have been an old foundation or footing. The concrete was chipped away using an electric jackhammer, and removed from the borehole. No other obstructions were encountered.

Borehole CP-115B

While attempting to drill the shallow portion of borehole CP-115B, buried obstructions were encountered at an approximate depth of 15 feet bgs during the first three attempts. After each encounter, the borehole was abandoned and a new attempt was made at a nearby location. On the third such attempt, an inactive pipe was encountered at an approximate depth of 1 to 1.5 feet bgs. The pipe diameter was approximately four to six inches. The pipe wall had been pierced by the auger bit, but no fluid was observed. An electric jackhammer was then used to enlarge the borehole in the concrete surface slab, so that the auger could be shifted away from the pipe and drilling could continue.

A second, smaller pipe, approximately two inches in diameter, was encountered at a depth of approximately 2 to 2.5 feet bgs. The pipe had been pierced by the auger bit, and a transparent brown liquid was observed to be leaking steadily from the pipe. A strong petroleum odor was also noted. The leak was contained, the liquid was pumped out of the pipe, and the contaminated soil was removed from the area surrounding the borehole and drummed. Approximately two to four gallons of liquid were recovered from the pipe. A sample of the recovered liquid was collected from the pump and submitted to a laboratory for hydrocarbon identification.

Both of the above pipes were then cut, all four ends were plugged, and drilling resumed. Again, an obstruction was encountered at a depth of approximately 15 feet bgs. The borehole was abandoned and a fourth attempt was made at a nearby location. No obstructions were encountered at this location.

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Borehole CP-120

Representatives of the USEPA have indicated that they would be amenable to a request for variance from the RFI Work Plan, to use the Port of Seattle's well MW-39-3 for sampling, in lieu of Burlington installing and sampling the proposed monitoring well CP-120. Burlington Technical Services Division personnel have presented these options to the appropriate personnel in Operations and in Regulatory Affairs, and are awaiting a decision on whether or not to install the well.

Borehole Stratigraphy

The stratigraphy of the subsurface encountered in the deeper portions (below the silty sand layer) of boreholes CP-106B, CP-115B, and CP-122B differed from that expected based on results of previous investigations. For instance, the deep aquifer was generally found to be thinner (4 feet versus at least 10 feet) and to consist of more fine-grained sediment than expected (fine to medium sand versus gravelly sand). Before any of the corresponding monitoring wells was installed, the drilling for all three of the boreholes was completed and lithologic logs and stratigraphic cross sections were compiled to establish appropriate screen placement. This increased the required completion time for well installation by increasing rig setup/takedown time. However, it allowed the wells' screened intervals to be selected with greater confidence due to the increased knowledge of stratigraphic conditions in the area.

PROJECTED WORK FOR THE NEXT REPORTING PERIOD

The following activities are projected for the next reporting period, which is from March 1 to April 30, 1993:

1. Deep-aquifer monitoring wells CP-106B, CP-115B and CP-122B will be completed in early March, and will be developed shortly thereafter.
2. The first tidal monitoring session was scheduled for during March 5-8, 1993, and is underway.
3. Rising-head slug tests will be conducted in the new monitoring wells; existing monitoring well CP-105B will be re-tested.

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4. If the USEPA approves the relevant variance request, temporary shallow piezometer CP-122A will be installed.
5. If the USEPA approves the revised Pumping Test Work Plan, Burlington will begin to make preparations for conducting the pumping test.
6. Engineering testing of soil samples collected from boreholes CP-106B, CP-115B, and CP-122B will be completed.
7. Chemical analyses of soil samples from these same three boreholes will be completed.
8. The locations of the new monitoring wells and hand auger boreholes will be surveyed.
9. The first round of groundwater sampling will be performed upon final completion of all monitoring wells, as indicated in the Pier 91 RFI Work Plan.

Please contact me if you have any questions about the above progress report.

LABORATORY TESTING RESULT SUMMARY

Pier 91 RFI
HWA project # 92170
February 26, 1993

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Burlington Environmental Inc.
Technical Services

Prepared for:

Burlington Environmental-
Technical Services Division
7440 West Marginal Way So.
Seattle, Washington 98108

Attention: Mr. Joe Depner

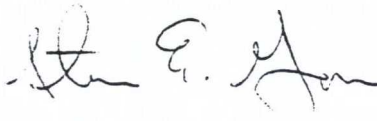
Samples for the Pier 91 RFI project were submitted by Mr. James Peale of Burlington Environmental on 2-10-93. The testing was conducted in accordance with the following specifications.

Triaxial Permeability: ASTM D 5084. The vertical permeability rates of three submitted samples were determined in accordance with ASTM D 5084. The samples were extruded from Shelby tubes and trimmed to achieve a 2 to 1 length to diameter ratio. The samples were then weighed and enclosed within a latex membrane. The specimens were mounted within a triaxial pressure chamber and incrementally backpressure saturated under a flow gradient of 3. The degree of saturation was checked by periodically measuring the pore pressure response to a simulated increase in hydrostatic pressure within the samples. Samples were considered saturated when pore pressure responses implied a B coefficient of .95 or greater. Permeability measurements were conducted until inflow and outflow volumes became equivalent for a given time interval.

Thank you for this opportunity to serve you. Should you have any questions regarding these results please do not hesitate to inquire.

Respectfully Submitted,

HONG WEST & ASSOCIATES, Inc.



Steven E. Greene
Soil Laboratory Manager

PIER 91 RFI
HWA LABORATORY TESTING SUMMARY

HWA Project No. 92170

February 26, 1993

Sample No.	Classification	Dry Unit Weight	Permeability
CP-106B 20-22 feet	SM	102.7 pcf at 25.5% moisture	$K = 8.1 \times 10^{-5}$ cm/sec.
CP-115B 22-24 feet	SM/ML	96.8 pcf at 26.9% moisture	$K = 1.0 \times 10^{-5}$ cm/sec.
CP-122B 24-26 feet	SM/ML	105.6 pcf at 22.1% moisture	$K = 4.8 \times 10^{-6}$ cm/sec.

Note: headspace readings utilizing Microtip during sample extrusion were:

CP-106B---- 2470 ppm

CP-115B---- < 50 ppm

CP-122B---- < 50 ppm